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Case Report

Tuberculosis Presenting With a Mediastinal Mass in an Infant

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Abstract

Tuberculosis (TB) remains an important cause of morbidity and mortality worldwide especially in developing countries. Major challenges of childhood TB include establishing an accurate diagnosis and the absence of a practical "gold standard" tests that can aid in the diagnosis. TB is a rare cause of mediastinal masses in children in general and infants in particular. There are few reported cases of mediastinal masses due to TB in the literature. Here, we present a case, which highlights the delayed diagnosis of a common disease due to an uncommon presentation.

Keywords: Tuberculosis, Mediastinal mass, Acid-Fast Bacilli, Tuberculin skin test

Abbreviations

TB : Tuberculosis
AFB: Acid-Fast Bacilli
TST : Tuberculin skin test
CRP: C-reactive protein
CXR: Chest x-ray
BCG: Bacillus Calmette-Guérin
MRI : Magnetic resonance imaging
AFP : Alpha-fetoprotein
ZN : Ziehl-Neelsen stain
PCR: Polymerase chain reaction
INH: Isoniazid

Introduction

Primary tuberculosis (TB) is a rare disease in young children. TB remains an important cause of morbidity and mortality worldwide especially in developing countries. Major challenges of childhood TB include difficulties in establishing an accurate diagnosis and the absence of a practical "gold standard" tests that can aid in the diagnosis. In the absence of a known adult source case, the diagnosis of TB in children can be difficult even more challenging. TB is a rare cause of mediastinal masses in children in general and infants in particular. There are few such cases reported in the literature [1]. Here, we present a case, of a 5 month-old infant who presented with mediastinal mass secondary to primary TB with the absence of a known adult source. This case highlights the delayed diagnosis of a common disease due to an uncommon presentation.

Case Report

A 5 month-old Pakistani boy, was admitted to the hospital with fever, cough and failure to gain weight. Symptoms started when he was 10 days old while visiting Pakistan where he received symptomatic treatment only. His condition did not improve and upon arrival to the United Arab Emirates (UAE) he was seen in a private hospital where he was found to have a mediastinal mass on chest x-ray (CXR) and was transferred to a tertiary care hospital for further evaluation.

Based on the patient's history, he is a healthy term infant who was delivered via spontaneous vaginal delivery with good APGAR score. The antenatal period was uneventful. He was sent home after receiving Bacillus Calmette-Guérin (BCG) vaccine. The initial postnatal period was normal until the age of 10 days when he developed fever and cough. There was no history of diarrhea, vomiting, oral thrush or diaper rash. No history of contact with active TB cases or with animals. He has one older sibling who is healthy and doing well. His vaccinations are up to date according to Pakistan immunizations schedule.He was only breast fed for 2 months and then was switched to formula. Developmentally, he has gross motor delay with otherwise normal developmental milestones.

Upon admission to our hospital he had normal vital signs. His growth parameters showed weight below the 3rd centile, with

otherwise normal growth parameters. He had no dysmorphic features and no BCG scar. He was not in respiratory distress. He had right cervical lymph node enlargement with decreased air entry in the right middle and lower lobes. Abdominal examination did not reveal any masses or hepatosplenomegaly. Other examinations were unremarkable.

Initial labs showed leukocytosis with microcytic hypochromic anemia. He was later found to have iron deficiency anemia. C-reactive protein (CRP) was 19 mg/L. CXR showed large ill-defined hilar and perihilar opacities in the right lung with mild pleural effusion (Figure 1). Magnetic resonance imaging (MRI) of the chest showed lobulated mediastinal mass mainly in the middle mediastinum, most likely representing lymphadenopathy (Figure 2). MRI of the abdomen was normal.

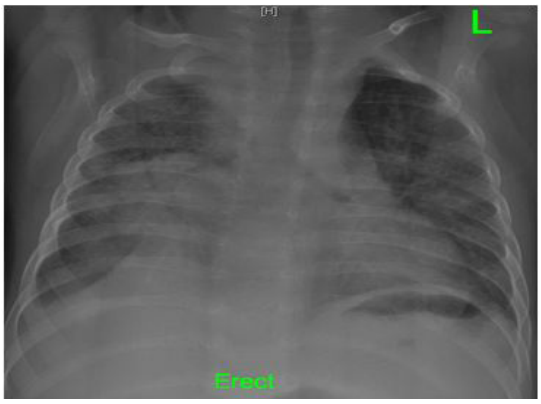

Figure 1: Evidence of large ill-defined hilar and perihilar opacities projecting in the right lung with mild right pleural effusion and mild bilateral lung congestion.

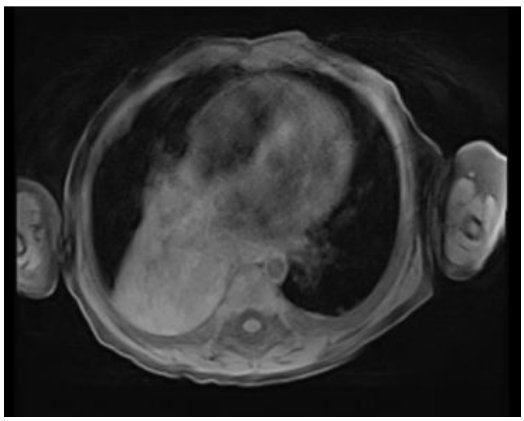

Figure 2: Lobulated mediastinal mass mainly in the middle mediastinum with extension anteriorly and posteriorly, most likely represent lymphadenopathy.

At this stage, malignancy and mycobacterial infection were suspected. Therefore, he was further investigated to identify the etiology of the mediastinal mass. Bone Marrow Biopsy showed no evidence of bone marrow infiltration. Alpha-fetoprotein (AFP) was normal. He underwent chest mass core biopsy, which showed necrotizing granulomatous inflammation but acid-fast bacilli (AFB) Ziehl-Neelsen (ZN) stain was negative. Fungal stains and cultures were negative. He had positive tuberculin skin test (TST) of 10 mm and positive Quantiferon TB test. Early morning gastric aspirate yielded AFB on smear microscopy for three consecutive days. Mycobacterium TB Polymerase chain reaction (PCR) was positive. Cervical lymph node biopsy showed necrotizing granulomatous inflammation and AFB was positive on ZN stain. Lumbar puncture ruled out CNS seeding. At this stage immunodeficiency workup also came back negative. The investigations included the following: Immunoglobulins level, lymphocyte subsets and HIV PCR, which were all negative. Hepatitis B&C were also non-reactive.

As soon as TB infection was confirmed, the patient was kept in a negative pressure room and was started on Isoniazid (INH), Rifampin, Pyrazinamide, Ethambutol and Pyridoxine. He was discharged home after having two negative early morning gastric aspirate samples. All of his household members were screened for TB and the results came back negative including his mother, father and sibling.

On further follow up the patient was found to be vitally stable, started to gain weight, and was tolerating the medications without any side effects. His follow up CXR showed significant improvement of right lung opacity with slight decrease in size of the right middle lobe consolidation and small residual right pleural effusion (Figure 3). His parents were instructed to continue the 4 medications for 2 months followed by INH and Rifampin alone for 4 months to complete a 6 months course.

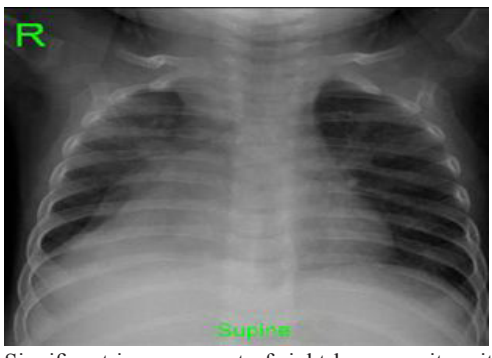

Figure 3: Significant improvement of right lung opacity with slight decrease in size of right middle lobe consolidation and small residual right pleural effusion.

Discussion

TB remains an important cause of morbidity and mortality worldwide especially in developing countries. Children represent one of the high-risk groups for this disease. A major challenge of

childhood TB is establishing an accurate diagnosis. TB in older children has been well described; however, it's description in infants is very limited. There are a few studies of infants with TB in the literature.

Infants may develop congenital TB from an infected mother or, most commonly, they may acquire postnatal disease by contact with an infectious adult source. Symptoms during this age can vary and are usually non- specific, but are usually marked by multiple organ involvement. The infected infant may look acutely or chronically ill and may have fever, lethargy, respiratory distress, hepatosplenomegaly, failure to thrive or a non-responsive pneumonia. Mediastinal mass is one of the uncommon presentations and might be confused with other more common etiologies of mediastinal masses in infancy like malignancies [1].

Although Mycobacterium TB infection in utero can be indistinguishable from perinatal or early postpartum infection, we believe that our case was most probably due to recent infection due to absence of maternal risk factors and negative screening results. Cantwell et al. [2] described set of criteria for congenital TB as follows, the infant must have a tuberculous lesion (e.g., infiltrates on the chest radiograph or granulomas) and at least one of the followings: 1) onset during the first week of life, 2) a primary hepatic TB complex or caseating hepatic granulomas, 3) infection of the placenta or maternal genital tract, or 4) exclusion of postnatal transmission by a contact investigation.

The diagnosis of pediatric TB in general presents a major challenge, as it is complicated by the absence of a practical "gold standard tests" [3,4] . The accepted gold standard is bacterial culture, which is of limited use in pediatric age group as the disease has paucibacillary nature in children. Not only that, but also sputum smear microscopy is positive in less than 10 to 15% of children with probable TB [5]. However, the yield is high in children with adult-type disease and sputum smear microscopy has definite diagnostic value in older children (more than 10 years of age) [6].

Mediastinal masses in pediatric age patients have a wide range of differential diagnoses, including benign and malignant tumors and chronic infectious diseases. Clinical and radiological findings may be very similar among these entities.

TB is a rare cause of mediastinal masses in children. In previous case series, TB was not found as a cause of mediastinal mass [7,8]. However, there are few case reports of cases presenting with TB as a mediastinal mass in the literature [9-13]. Most of these cases presented with respiratory symptoms and were diagnosedwith pneumonia that did not respond to anti-microbial therapy. Although this unusual presentation of TB can be seen in patients with primary immunodeficiencies [14], no underlying immune deficiency was detected in our patient.

In conclusion, we reported a case of TB in an infant who presented with a mediastinal mass. We supported this diagnosis with laboratory findings that include tuberculin skin test and early morning gastric aspirate examination for acid fast bacilli. With anti TB therapy, clinical remission was achieved. It is very important to suspect TB in infants who are at high risk and who have pneumonia that is not responding to the usual anti-microbial therapy. If TB is diagnosed in infancy period, family surveillance for TB must be performed.

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